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US Army Corps of Engineers

Toxic and Hazardous
Materials Agency

APPENDED FIELD SAMPLING PLAN FOR TASK ORDER 1

for the

RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) and Base Closure Environmental Study for the Lexington-Blue Grass Army Depot

Submitted to:

Commander
Department of the Army
United States Army Toxic and Hazardous Material Agency
Aberdeen Proving Ground, Maryland

Submitted by

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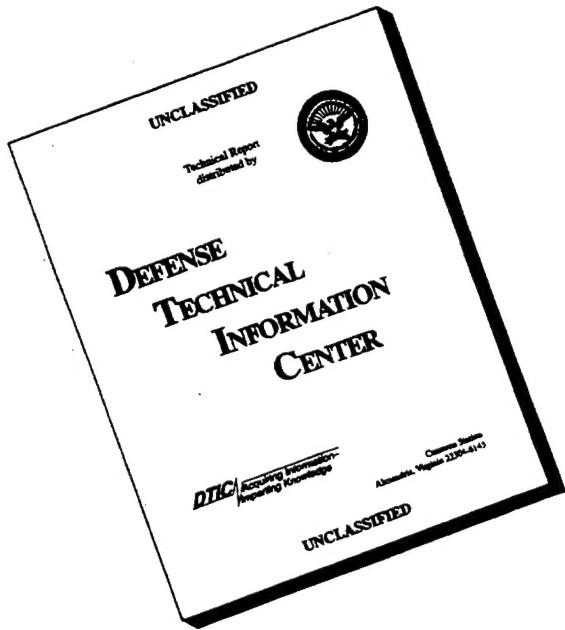
Prepared Under:

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INTRODUCTION

Metcalf & Eddy, Inc. (M&E) under contract with the United States Army Toxic and Hazardous Materials Agency (USATHAMA), contract number DAAA15-90-D-0016 Task Order Number 4, has appended the Field Sampling Plan for the RFI/CMS for base closure at the Lexington-Blue Grass Army Depot, Kentucky. This appendix describes comments, addenda, corrections, and clarifications to *Task Order 1, Field Sampling Plan, Lexington-Blue Grass Army Depot, Kentucky* (USATHAMA, 1991), henceforth called the "original document."

USEPA review comments of July 31, 1991, on the original document were incorporated into this appendix unless the comment suggested work outside the contracted scope of work for Task Order 4. Work outside the contracted scope will be conducted at a later date, as deemed necessary by the COR.

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AMENDMENTS/CLARIFICATIONS/ADDITIONS TO THE SAP

The Field Sampling Plan is hereby amended/clarified/appended as follows.

Section 2.3, Page 3, Paragraph 1:

Delete: 5) "Rinse with O.I.N Nitric...distilled water."

Change: 6)

Change to: 5)

Change: "pesticide grade methanol"

Change to: "isopropanol alcohol."

Change: 7)

Change to: 6)

Section 2.3, Page 3, Paragraph 2:

Change: "supply of pesticide-grade methanol"

Change to: "supply of isopropanol alcohol"

Section 2.3, Page 3, Paragraph 3:

Add: "bailers" to "(barrel sampler, ...PVC tube, bailers, etc.)"

Change: Line 3

Change to: "rinsed with distilled water."

Delete: "then rinsed...sampled equipment)."'

Change: Line 5 from "pesticide-grade methanol"

Change to: "isopropanol alcohol"

Change: Line 5 from "methanol rinse" and "stacked"

Change to: "alcohol rinse" and "placed"

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Change: Last sentence from "Decon. Methanol Water Rinsate"

Change to: "Decon. Alcohol Water Rinsate"

Section 2.3, Page 3, Paragraph 5:

Change: "Bailers and Pumps"

Change to: "Pumps"

Delete: "Bailers and nylon rope...kept in plastic bags."

Section 2.3, Page 4, Paragraph 1:

Delete: "1) Prior to collection...contact the bottle." and "5) As a final...disposable gloves."

Change: "2." to "1.;" "3." to "2.;" "4." to "3.;" "6." to "4."

Section 2.4, Page 4, Fluid Residuals:

Change: Line 3, 4 from "methanol, nitric acid"

Change to: "alcohol"

Change: Line 8 from "staging area."

Change to: "well."

Change: Insert at end of paragraph "Note: purge water from water supply wells will not be stored."

Section 2.19, Page 28, Procedure:

Add to #2: "A stainless steel chip retainer will be used to prevent the chips from dispersing."

Change: #5 from "Mix a small amount of concrete in a pail with a spade."

Change to: "A commercially available concrete patch will be used to repair the hole."

Section 3.1, Page 5, Paragraph 3:

- Change: The PVC screen will be 10 feet in length.
- Change to: The PVC screen will be 15 feet in length for wells.
- Delete: Size specifications for the sand filter pack will be established from grain size analyses conducted on soil samples collected during installation.
- Change: Filter pack material will be installed using a tremie pipe so that the filter extends from the bottom of the boring to a maximum of two feet above the top of the screen unless otherwise specified.
- Change to: Filter pack material will be installed by slowly pouring the filter pack material to elevate bridging within the boring. The filter pack will extend above the screen at least 5 feet.

Section 3.1, Page 5, Paragraph 4:

- Change: The hollow stem auger technique will be supplemented with air rotary drilling.

Section 3.1, Page 5, Paragraph 5:

Insert between #1 and #2: After bedrock depth is reached, the augers will be pulled and drilling will proceed using an air rotary 8-inch OD tricone bit.

Section 3.1, Page 5, Paragraph 6:

Change paragraph to: After the borehole has been augered to bedrock, the augers will be removed and the boring will be finished to total depth using the 8 inch O.D. air rotary bit.

Section 3.1, Page 5, Paragraph 7:

Change: "Casing"

Change to: "Screen and riser"

Section 3.1, Page 5, Paragraph 8:

Change Paragraph to: The sand filter pack will be poured down hole until the sand filter extends from the bottom of the boring to approximately 5 feet above the top of the

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well screen. If the well is being installed in unconsolidated material, the augers will be slowly withdrawn as the filter pack advances upwards in the annular space. The top of the filter pack will be confirmed (tagged) by tapping it with a weighted tape.

Section 3.1, Page 6, Paragraph 1:

Add: If the seal location is too far below the water to allow for pellet placement, and as a last resort, a thick (high viscosity) slurry will be placed to a thickness no greater than 5 feet with the use of a tremie pipe. Wells set in bedrock will have the bentonite seal set at least 3 feet below the top of firm bedrock.

Section 3.1, Page 6, Paragraph 3:

Change: "stainless steel casing"

Change to: "PVC Riser"

Section 3.1, Page 6, Paragraph 4:

Change: "A concrete well apron will be poured around the protective casing in such a manner that it directs any surface water away from the well head."

Change to: A 0.5 foot thick coarse gravel well apron will be placed around the protective casing radially to 4 feet.

Section 3.1, Page 6, Paragraph 5:

Change to: "Four steel pickets will be installed radially 4 feet from the well. These pickets will be set 2 to 3 feet below grade and will stick up a minimum of 3 feet above ground. They will be painted orange with a brush prior to sampling the well."

Section 3.1, Page 6, Paragraph 7:

Change: "The pump intake will be lowered into the well above the screened interval. A bailer will be used to remove fines from the well. The well will be developed by alternately pumping and bailing until the water is visibly free of fines."

Change to: "The pump's intake will be lowered into the well, above the screened interval, and pumped until the water is visibly free of fines. The pump will then be lowered at 2 feet intervals and pumped to visual clarity. This procedure will continue to total depth. If necessary, a bailer will be used to remove fines."

Section 3.2, Page 6, Introduction:

Change: Line 2 from "electronic water level indicator"

Change to: "electronic water level indicator or similar instrument"

Section 3.4, Page 8 and 9, Trenching Operations:

Delete: "3. The elevation...begin."

Change: "4." to "3.;" "5." to "4.;" "6." to "5.;" "7." to "6;" "8." to "7.;" "9." to "8.;" "10." to "9.;" "11." to "10.;" "12." to "11."

Change New #7. to Read: "if required, soil or groundwater samples will be collected from the trench in accordance with the Standard Operating Procedures as described in Section 3.9. In the case that samples can be collected from the backhoe, a stainless steel spoon or scoop will be used to obtain a representative sample from the center of the bucket. Care will be taken not to sample any material that may have contacted the bucket walls.

Section 3.6, Page 11, Introduction:

Add to Line 1: "...Celsius thermometer" or digital Fahrenheit thermometer.

Section 3.7, Page 11, Introduction:

Delete: "This procedure...Model 33 S-C-T Meter."

Delete: "(YSI....Meter)."

Section 3.8, Page 14, Procedure:

Delete: "It is anticipate...from the meters display."

Delete: "If any pH meter...is used,"

Section 3.12, Page 19, Stream Discharge Measurements:

Change: #10: "0.8"

Change to: "0.9"

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Section 3.16, Page 23, Introduction:

Change: "The survey meter to be used"

Change to: "A survey meter will be used."

Delete: "...will be the GASTECH Protector II Model 2862."

Section 3.19, Page 28, Paragraph 4:

Change: "Document the rationale for this choice in the field logbook."

Change to: "Document the rationale for this choice in the field logbook, and estimate the percent of area covered by the spill."

Section 3.22, Page 30, Paragraph 10:

Change: "The grout mix will consist of neat Portland Cement (ASTM C150), mixed with three pounds of commercial calcium bentonite powder and 7.5 gallons of water for each 94 pound bag of cement."

Change to: "The grout mix will consist of 20 parts Portland cement, and 1 part bentonite, by weight, with a maximum of 8 gallons of water per 94 pound bag of cement."

Section 3.22, Page 30, Paragraph 11:

Delete: "In this case, the screened portion of the well will be filled with sand which is compatible with the filter pack already surrounding the screen to approximately 2 feet above the level of the screen."

Section 3.22, Page 30, Paragraph 12:

Delete Paragraph.

Section 3.22, Page 30, Paragraph 13:

Change: "7" to "6"

Change: "with grout mix as specified above."

Change to: "with grout mix to ground surface."

Section 3.22, Page 30, Paragraph 14

Change: "8" to "7"

Section 3.22, page 30, Paragraph 14 and 15

Insert: "8. After 24 hours, M&E will check the site for grout settlement and add more grout to fill any settlement depression. This process will be repeated until firm grout remains at ground surface."

Section 3.23, Page 31 and 32, Measuring Water Level by Air Pressure:

Delete entire section.

Section 3.26, Page 36, #1, 2nd Sentence:

Change: After "Teflon", add "or equivalent".

Section 3.26, Page 36, #1, 3rd Sentence:

Change: After "Tedlar bag", add "or other sampling device".

Section 3.26, Page 36, #2, 2nd Sentence:

Change: After "Tedlar bag", add "or other sampling device".

Section 3.26, Page 36, #2, Last Sentence:

Change: After "microsyringe", add "or thermally desorbed from a concentrating sampling device".

Section 3.26, Page 36, #3:

Change: Delete last sentence.

Section 3.26, Page 36, #4:

Delete: Step #4 and renumber other steps accordingly.

Section 3.26, Page 37, #6:

Change: Delete 3rd sentence.

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Section 4.1.1.3, Page 43, Paragraph 4:

Insert at end of Paragraph: "A total of 4 samples will be collected, one in each trench or boring location. If the soil/waste interface is reached while trenching, the sample will be collected per the procedure described in Section 3.4. If the soil/waste interface is reached by drilling, the soil sample will be collected per the procedure described in Section 3.9. The soil samples will be analyzed for TCL compounds.

Section 4.1.1.3, Page 43, Paragraph 6:

Delete Line: The two-inch wells will be placed in the upper 20 feet of the upper water-bearing zone and will be installed with a screen the length of 15 feet.

Section 4.1.2.1, Page 45, Paragraph 2, Lines 3-8:

Change: "The monitoring well labelled...outlined in Section 3.1."

Change to: The wells will be installed to a depth required to reach at least 10 feet of saturated thickness. These wells will be constructed using a 15 foot screen such that 10 feet is below the water table and 5 feet is above the water table. Thus screening the saturated/unsaturated interface. Each well will be drilled, installed, and developed according to the procedures outlined in Section 3.1.

Section 4.1.2.3, Page 45, Paragraph 5:

Change: "2 to 3 feet and 3 to 4 feet"

Change to: "2 to 3 feet and 3 to 4 feet, or to refusal"

Section 4.1.3.3, Page 46, Paragraph 6, Lines 3-6:

Change: The monitoring wells will...outlined in Section 3.1.

Change to: The monitoring wells will be constructed using a 15 foot screen such that 10 feet is below the water table and 5 feet is above the water table. Thus screening the saturated/unsaturated interface. Each well will be drilled, installed, and developed according to the procedures outlined in Section 3.1.

Section 4.1.3.3, Page 47, Paragraph 4:

Change: "Ten (10) sediment samples"

Change to: "Six (6) soil samples"

Change: "Outlined in Section 3.10"

Change to: "Outlined in Section 3.11"

Add: "Samples will be collected from 0-1 foot or to refusal."

Section 4.1.4.1.3, Page 48, Paragraph 3:

Change: "1 to 2 feet, and 3 to 4 feet in depth"

Change to: "1 to 2 feet, and 3 to 4 feet in depth or to refusal"

Section 4.1.4.2.3, Page 49, Paragraph 1:

Change: "If a soil boring is necessary to reach the soil/waste interface, a soil sample will be collected for analysis of Target Analytes and Target Compounds."

Change to: A total of two (2) samples, one (1) sample per trench will be collected at the soil/waste interface using the procedure described in Section 3.4 if the interface is reached while trenching, or the procedure described in Section 3.9 if the interface is reached by drilling. The soil sample collected will be analyzed for Target Analytes and Target Compounds.

Section 4.1.4.2.3, Page 49, Paragraph 1:

Delete: "The soil boring will be drilled and sampled as described in Section 3.9."

Section 4.1.4.2.3, Page 49, Paragraph 2:

Change: "0 to 1 foot, and 2 to 3 feet,"

Change to: "0 to 1 foot, and 2 to 3 feet, or to refusal"

Section 4.1.4.3.3, Page 49, Paragraph 5 and 6:

Insert between Paragraph 5 and 6: Geophysical Survey. In order to determine the extent of disposal in the area of Area C, a resistivity geophysical survey will be conducted over the surface of the known location and outside the perimeters of the potential locations as necessary. The survey will be conducted as outlined in Section 3.18.

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Section 4.1.4.3.3, Page 49, Paragraph 7:

Delete: "If a soil boring is necessary to reach the soil/waste interface, a soil sample will be collected for analysis of Target Analytes and Target Compounds. The boring will be drilled and sampled as described in Section 3.9."

Add: "One soil sample will be collected at the soil/waste interface using the procedure described in Section 3.4 if the interface is reached while trenching, or using the procedure described in Section 3.9 if the interface is reached by drilling. The soil sample collected will be analyzed for Target Analytes and Target Compounds.

Section 4.1.4.3.3, Page 50, Paragraph 1:

Change: "such that four (4) shallow soil borings"

Change to: "such that two (2) shallow soil borings"

Section 4.1.5.3, Page 51, Paragraph 2:

Change: "Twelve (12) sediment sample locations; six (6) from each lagoon will be investigated"

Change to: Six (6) sediment sample locations; three (3) from each lagoon will be investigated"

Change: "0-1 foot, 2-3 feet and 4-5 feet"

Change to: 0-1 foot, 1-2 feet and 2 to 3 feet, unless the soil sediment interface underlying the lagoons is reached.

Section 4.1.5.3, Page 51, Paragraph 2:

Change: "intervals according to the procedures described in Section 3.10,"

Change to: "Samples will be collected according to the procedure described in Section 3.10."

Section 4.1.5.3, Page 51, Paragraph 3:

Change: "and 4 to 5 feet below the sediment/soil interface underlying the lagoons."

Change to: "and 4 to 5 feet below the approximate depth of the sediment/soil interface underlying the lagoons, or to refusal."

Section 4.1.5.3, Page 51, Paragraph 4:

Change: "Twelve (12) shallow soil borings"

Change to: "Eight (8) shallow soil borings"

Section 4.1.5.3, Page 51, Paragraph 5, Lines 3-6:

Change: The monitoring well...outlined in Section 3.1.

Change to: The monitoring well will be constructed using a 15 foot screen such that 10 feet is below the water table and 5 feet is above the water table. Thus screening the saturated/unsaturated interface. Each well will be drilled, installed, and developed according to the procedures outlined in Section 3.1.

Section 4.1.5.3, Page 51, Paragraph 9:

Change: "Three (3) soil samples"

Change to: Two (2) soil samples"

Section 4.2.1.3, Page 53, Field Investigation:

Add prior to "Soil Gas Sampling":

"Geophysical Survey. To locate the underground storage tank on the northeast side of the building, a geophysical (electromagnetic) survey will be conducted over the area where the tank is suspected to be. The survey will be conducted as outlined in Section 3.17. The location of the tank will be marked with flags for future reference.

Section 4.2.1.3, Page 53, Paragraph 6:

Change: "Three (3) concrete chip samples will be collected, one each from the two painting areas and the plating area,"

Change to: "Five (5) concrete chip samples will be collected, one each from the two painting areas, one from the plating area, and two from the concrete floor underlying the wood block floor in the main production area.

Change: "Will be analyzed for Toxicity Characteristic Leaching Procedure (TCLP) compounds."

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Change to: "Will be analyzed for Target Compound List (TCL) compounds."

Section 4.2.1.3, Page 53, Paragraph 7:

Delete whole paragraph.

Section 4.2.2.3, Page 54, Paragraph 5:

Change: "up to two (2) concrete chip samples"

Change to: "up to 4 concrete chip samples"

Change: "Analyzed for Toxicity Characteristic Leaching Procedure (TCLP)"

Change to: "Analyzed for Target Compound List (TCL)"

Add: "If conditions are such that concrete samples cannot be collected in an area of suspected spillage, wipe samples will be substituted and collected per SOP."

Section 4.2.2.3, Page 54, Paragraph 6:

Delete Paragraph.

Section 4.2.3.3, Page 55, Paragraph 2:

Change Paragraph to: Six (6) wipe sample will be collected per Section 3.13 for PCB analysis from the two shredding areas. Two samples will be collected around the dock area at the course crushing area and one sample will be collected from the crusher discharge chute. Two samples will also be collected from the fluff shredding equipment room and 1 sample will be collected from the fluff shredder discharge chute.

Section 4.3.1.3, Page 55, Last Paragraph:

Delete entire paragraph.

Section 4.3.1.3, Page 56, Paragraph 1:

Change Paragraph to: Due to the nature of the activities which have been conducted in Building 3, five (5) concrete samples will be collected from the interior of the building. If identifiable, samples will be collected in areas suspected to have received spillage of contaminants. Samples will be collected according to procedures outlines in Section 3.19 and will be analyzed for Target Compound List (TCL) compounds."

Section 4.3.2.3, Page 56, Paragraph 7:

Change: "Will be analyzed for the Toxicity Characteristic Leaching Procedure (TCLP) compounds."

Change to: "Will be analyzed for the Target Compound List (TCL) compounds."

Section 4.3.3.3, Page 57, Paragraph 5:

Change: "will be analyzed for Toxicity Characteristic Leaching Procedure (TCLP)."

Change to: will be analyzed for Target Compound List (TCL) compounds."

Section 4.3.5.3, Page 58, Paragraph 8:

Change: "Will be analyzed for TCLP."

Change to: "Will be analyzed for Target Compound List (TCL)"

Section 4.3.6.3, Page 59, Paragraph 5:

Change Paragraph to: One (1) wipe sample will be collected from the surface of the 500 KW electric generator housed in Building 64, according to procedures outlined in Section 3.3. This sample will be analyzed for PCBs only.

Section 4.3.6.3, Page 59, Paragraph 1:

Change Paragraph to: "Concrete Chip Sampling. Up to two (2) Concrete Chip samples will be collected. One from an area on the floor where evidence of a spill is apparent or where spillage is likely, and one outside the building. These samples will be collected according to procedures outlined in Section 3.19 and will be analyzed for PCBs.

Section 4.3.7.3, Page 60, Paragraph 3:

Change: "TCLP"

Change to: "TCL"

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Section 4.3.7.3, Page 60, Paragraph 3:

Change: "analyzed for TCLP compounds"

Change to: "analyzed for TCL compounds"

Section 4.3.8.3, Page 60, Paragraph 8:

Change Paragraph to: Due to the Nature of Activities which have been conducted in Building 130, one (1) wipe sample will be collected from the filtration equipment present. This wipe sample will be analyzed for Target Compound List (TCL) compounds.

Add New Paragraph to Section: "Concrete Chip Samples. Two (2) concrete chip samples will be collected from the interior of the building. These samples will be collected from areas in which it appears likely that a large amount of activity has taken place, and will be collected in accordance with Standard Operating Procedures. Chip samples will be analyzed for Target Compound List (TCL) compounds."

Section 4.3.8.3, Page 61, Paragraph 1:

Change: "Two (2) soil samples"

Change to: "One (1) soil sample"

Change: "samples will be collected"

Change to: "sample will be collected"

Change: "The approximate location of these soil samples are"

Change to: "The approximate location of this soil sample is"

Change: "The soil samples will be collected as outlined in Section 3.3."

Change to: "The soil sample will be collected as outlined in Section 3.3."

Section 4.4.1.3, Page 62, Paragraph 7:

Paragraph should read: "Concrete Chip Samples/Wipe Samples. Up to three (3) concrete chip samples, or where chip sampling is not possible, three (3) wipe samples will be collected from areas of each building where evidence of a spill is apparent or where past spillage is likely. These samples will be collected according to procedures

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described in Section 3.13 or 3.19 and will be analyzed for Target Compound List (TCL) Semi-Volatile Organics.

Section 4.4.3.3, Page 64, Paragraph 2:

Change: "2 to 3 feet and 5 to 6 feet."

Change to: "2 to 3 feet and 5 to 6 feet, or to auger refusal."

Section 4.5.3, Page 65, Paragraph 3:

Change: "TCLP"

Change to: "TCL"

Section 4.6.1.3, Page 65, Paragraph 9:

Change: "will be analyzed for TCLP compounds"

Change to: "will be analyzed for TCL compounds. If the hazardous waste storage area cannot be located, a random sample will be collected."

Section 4.6.2, Page 66, Heading:

Change: "Building 27"

Change to: "Building 27 (SWMU #9)"

Section 4.6.2.3, Page 66, Paragraph 5:

Delete Paragraph.

Section 4.6.2.3, Page 66, Paragraph 6:

Change Paragraph to: "Two (2) concrete chip samples will be collected from the floor of each of the six rooms where evidence of a spill is apparent or where past spillage is likely. These samples will be collected according to procedures described in Section 3.19 and will be analyzed for TCL compounds."

Section 4.9.3, Page 70, Paragraph 2:

Change: "will be analyzed for TCLP compounds."

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Change to: "will be analyzed for TCL compounds."

Section 4.10.3, Page 70, Paragraph 6:

Change: "4 to 5 feet according to"

Change to: "4 to 5 feet or to auger refusal according"

Section 4.10.3, Page 71, Paragraph 2:

Change: "TCLP"

Change to: "TCL"

Section 4.12.1, Page 73, Site Description:

Delete: Paragraphs 1 and 2.

Replace with: "There are currently two underground storage tanks (UST's) at the Lexington Facility that have not been located as to their exact position. One tank is generally located on the northeast side of Building 135. The second tank is located at the Air Strip Landing Field."

Section 4.12.2, Page 73, Technical Objectives:

Add: "Determine the presence or absence of UST's near Building 135 and the Air Strip Landing Field."

Section 4.12.3, Page 73, Field Investigation:

Add prior to "Soil Gas Sampling": "Geophysical Survey. A geophysical (electromagnetic) survey will be conducted at the northeast side of Building 135 and at the area suspected of having an UST at the Air Strip Landing Field."

Delete in Soil Gas Sampling: "...around each of...Buildings 140 and 141, and 33."

Change in Soil Gas Sampling: "...at each of the three tank locations, ..." to "...at each of the two locations if tanks are determined to be present."

Section 4.17.1, Page 76, Site Description:

Change: "Four drinking water wells (Wells 1, 3, 4, and 7)"

Change to: "Nine drinking water wells (Wells 1, 2, 3, 4, 5, 6, 7, 8, and 9)"

Section 4.17.3, page 76, Water Supply Well Sampling:

Change Paragraph to Read: Water Supply Well Sampling. In order to determine whether the drinking wells are contaminated, wells 1, 8, and 9 will be sampled and analyzed for TCL compounds. Wells 2, 3, 4, 5, 6, and 7 will not be sampled because: well 2 is dry, the access lines to wells 3 and 4 are broken, wells 5 and 6 could not be located by M&E or base personnel, and well 7 is broken and inaccessible. In addition, groundwater level measurements will be collected, if accessible, per Section 3.22, from each sampled well as part of the overall evaluation of facility-wide groundwater flow patterns.

Section 4.19.3, Page 78, Paragraph 6:

Change Paragraph to Read: "Sediment Sampling. Up to five (5) sediment samples will be collected. The samples will be collected from suspected discharge areas, below confluence areas, and areas draining off site. All samples will be analysed for TCL compounds.

Section 4.20 Background Samples

Section 4.20.1, Site Description: This unit consists of a drainage area northwest of Briar Hill Road, East of the New Landfill and southwest of the Northeast Property Boundary. The area is situated on a topographic high with surface water drainage away from sources of contamination. The area is believed to be undisturbed, and no references have been found to indicate a past disposal history that would have provided contamination.

Section 4.20.2, Technical Objective: The following technical objective is based on data needs identified in the Technical Plan.

- Collect soil samples indicative of background conditions within the Lexington Site boundary.

Section 4.20.3, Field Investigation: The following paragraph describes the investigation program proposed to meet the technical objectives listed above.

Shallow Soil Borings: Seven (7) shallow soil borings will be drilled within the area described at the locations shown on Figure 4-13. Samples will be collected in the borings at a depth from 0 to 1 foot, 2 to 3 feet or to auger refusal. These samples will be collected according to procedures described in Section 3.11, and will be analyzed for Target Compound List (TCL) compounds (except for Volatiles in the 0 to 1 foot interval).

Definition

The following are definitions and summaries of the collection procedures for the various blanks and duplicates which will be collected at Lexington Blue Grass Army Depot. Refer to Table 4-1 for the collection frequency and method.

Blanks

1. Trip Blanks are prepared at the laboratory, and consist of laboratory reagent water which is placed in VOC containers, then sealed. One trip blank sample is to accompany each cooler which is shipped from the site, and which contains samples to be analyzed for volatile organics.
2. Equipment Rinsate Blanks will be collected from sample equipment which has undergone decontamination. Organic-free, deionized water will be poured over and/or through the sampling device, and collected for analyses. These samples will be analyzed for the same parameters as those of the accompanying investigative samples. Preservatives will be added to sample containers, as appropriate.
3. Field Blanks, in contrast to equipment rinsate blanks, Field Blanks will be collected at those locations at which samples will be collected from disposable, non-decontaminated equipment. Appropriate sample containers will be filled with organic-free, deionized water, without contacting the sample equipment. Preservatives will be added to sample containers, as appropriate. These samples will be analyzed for the same parameters as those of the accompanying investigative samples.

Duplicates

In addition to those blank samples, field duplicates will be collected from groundwater, surface water, and background soil locations. The definition of a field duplicate is as follows:

A second sample from one site taken in the field and submitted to the laboratory as a separate sample. It is usually analyzed "blind" by the laboratory. The result acts to measure the combined precision of sampling and analyses.

Appendices

Appendix B has been revised. See attached revision.

Appendix A has been revised. The Geologic Log form and Well Installation form to be used are attached.

Tables

Table 4-1 revised to show number of samples and analyses of samples. See revised table.

Figures

Figure 4-1 revised to show new well and sampling locations. See attached revised map.

Figure 4-2 revised to show new well and sampling locations. See attached revised map.

Figure 4-2 revised to show new sampling locations. See attached revised map.

Figure 4-13 added to show new background sampling locations. See attached map.

APPENDIX B

**SAMPLE VOLUMES, CONTAINERS, AND PRESERVATIVES
FOR WATER SAMPLES**

<u>Analysis</u>	<u>Container/Volume</u>	<u>Preservation</u>	<u>Maximum Holding Time</u>
Volatile Organic Compounds	(2) 40-ml vials (no head space)	Cool to 4°C Add 4 drops of 1:1 HCL 25 mg ascorbic acid if residual chlorine	14 days
Total Petroleum Hydrocarbons	(1) 1-liter amber glass	Cool to 4°C H_2SO_4 ($\text{pH} < 2$)	28 days
Semivolatile Organic Compounds	(1) 1-liter amber glass bottle	Cool to 4°C	7 days extraction 14 days to analysis
Pesticides/PCBs	(1) 1-liter amber glass bottle	Cool to 4°C	7 days extraction 14 days to analysis
Metals	(1) 500 ml plastic bottle	Cool to 4°C 1/2 ml HNO_3 ($\text{pH} < 2$)	Hg - 28 days all others 180 days
Cyanide	(1) 1-liter plastic bottle	1 ml NaOH ($\text{pH} > 12$) 0.6 g. ascorbic acid if residual chlorine Cool to 4°C	14 days
Lead (GFAA)	(1) 500 ml plastic bottle	Cool to 4°C 1/2 ml HNO_3 ($\text{pH} < 2$)	180 days

APPENDIX B (Continued)**SAMPLE VOLUMES, CONTAINERS, AND PRESERVATIVES
FOR SOIL/SEDIMENT SAMPLES**

<u>Analysis</u>	<u>Container/Volume</u>	<u>Preservation</u>	<u>Maximum Holding Time</u>
Volatile Organic Compounds	(1) 4 oz. wide mouth glass jar	Cool to 4°C	14 days
Semivolatile Organic Compounds	(1) 4 oz. wide mouth glass jar	Cool to 4°C	7 days to extraction 40 days to analysis
Pesticides/PCBs	(1) 4 oz. wide mouth glass jar	Cool to 4°C	7 days to extraction 40 days to analysis
All inorganics and TPH	(1) 4 oz. wide mouth glass jar	Cool to 4°C	Cyanide - 14 days TPH, Hg - 28 days all others 180 days
TCLP	(1) 8 oz. wide mouth glass jar	Cool to 4°C	None established

APPENDIX B (Continued)

**SAMPLE VOLUMES, CONTAINERS, AND PRESERVATIVES
FOR WIPE SAMPLES**

<u>Analysis</u>	<u>Container/Volume</u>	<u>Preservation</u>	<u>Maximum Holding Time</u>
Semivolatile Organic Compounds	(1) 4 oz. wide mouth glass	None	None established
Pesticides/PCBs	(1) 4 oz. wide mouth glass	None	None established
Metals (ICP)	(1) 4 oz. wide mouth glass	None	None established
Selenium	(1) 4 oz. wide mouth glass	None	None established
Lead	(1) 4 oz. wide mouth glass	None	None established
Arsenic	(1) 4 oz. wide mouth glass	None	None established
Mercury	(1) 4 oz. wide mouth glass	None	None established
Cyanide	(1) 4 oz. wide mouth glass	None	None established

FINAL

APPENDIX B (Continued)

**SAMPLE VOLUMES, CONTAINERS, AND PRESERVATIVES
FOR CONCRETE CHIP SAMPLES**

<u>Analysis</u>	<u>Container/Volume</u>	<u>Preservation</u>	<u>Maximum Holding Time</u>
Volatile Organic Compounds	(2) 8 oz. wide mouth glass jar	None	None established
SemiVolatile Organic Compounds	(2) 8 oz. wide mouth glass jar	None	None established
PCB - Pesticides	(2) 8 oz. wide mouth glass jar	None	None established
Inorganics	(2) 8 oz. wide mouth glass jar	None	None established

-
- Containers supplied by laboratory. Preparation according to laboratory and method specifications.
If detection limits lower than laboratory standard protocol are requested, three vials will be supplied.
 - Minimize atmospheric exposure before analysis.

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG



PROJECT :							SHEET	BORING NO.		
SITE LOCATION					JOB NO.	1 OF				
					LOCATION:	GROUND ELEV.	TOTAL DEPTH			
DRILL CONTRACTOR:					ENG/GEO:	BEGUN :				
DRILL RIG:					DRILLER:	FINISHED:				
HOLE SIZE:		WEATHER:			GROUND WATER (DEPTH/ELEV.):					
DRILLING METHOD:					DRILLING FLUID/SOURCE:	TOP OF ROCK (DEPTH/ELEV.):				
DEPTH	SAMPLE TYPE/NO.	SAMPLE	DEPTH	SAMPLE RECOVERY feet or inches OR COUNT	DRILLING TIME (min/ft)	% RECOVERY PER FWD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
5										
10										
15										
20										
25										
SAMPLE TYPES SS=SPLIT SPOON, ST=SHELBY TUBE R=ROCK CORE, O=OTHER					NOTES:			BORING NO.:		

APPENDIX A

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG



APPENDIX A

MONITORING WELL CONSTRUCTION		PROJECT:	JOB NO.	WELL NO.
DRILLING CONTRACTOR:		COORDINATES:		
BEGUN:	SUPERVISOR:	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED:	DRILLER:			
REFERENCE POINT & ELEVATION:				DEPTH IN ELEV. IN
<p>The diagram illustrates the cross-section of a monitoring well. It shows the following layers from top to bottom:</p> <ul style="list-style-type: none"> Protective Cap: Located at the very top, above the ground surface. Ground Surface: The surface level, indicated by a horizontal line. 1" Surface Casing: A vertical pipe section with a diameter and type specified in the adjacent column. Top of Riser Casing: The uppermost part of the riser casing, indicated by a horizontal line. 2" Surface Casing: A vertical pipe section with a diameter and type specified in the adjacent column. Bottom of 1" Surface Casing: The lower boundary of the 1" surface casing. Bottom of 2" Surface Casing: The lower boundary of the 2" surface casing. Backfill: The material filling the annular space between the outer wall and the backfill. Riser Casing: A vertical pipe section with a diameter and type specified in the adjacent column. Top of Seal: The upper boundary of the seal. Annular Seal: A horizontal layer of sealant. Bottom of Seal: The lower boundary of the seal. Top of Screen: The upper boundary of the screen. Filter Material: A porous medium used to filter the water. Screen: A perforated metal tube used to collect water. Its diameter and opening width are specified in the adjacent column. Bottom of Screen: The lower boundary of the screen. Hole Diameter: The diameter of the well bore. Bottom of Hole: The lowest point of the well bore. 				
METHOD DRILLED:		COMMENTS:		
METHOD DEVELOPED:				

TABLE 4-1
REQUIRED SAMPLES

AREA	Survey Type or Media	Figure Showing Locations	Number of Locations	Samples at Each Location	QA/QC Samples duplicates	Total Samples blanks	Analytical Parameters
Old Landfill							
Soil Borings			10	1-2', 2-3' 0-1'	0	2	TCL
Groundwater	4.1		5 new wells up to 4	1 1 1 1 0-1', 1-2'	0 0 1 0 0	1 1 1 0 1 1 1	TCL (exc VOCs) TCL TCL TCL TCL
Seeps						0 up to 4 6 9	
Tributary Water	4.1		4				
Tributary Sediment	4.1		4				
Geophysical Survey							
Slug Testing			5				
Trenches			4	1			
Industrial and Sanitary Waste Disposal Landfill							
Drainage Ditch							
Soil/Sediment	4.1		3 ditches	2 per ditch	0	1	TCL (exc VOCs)
Tributary Water	4.1		4	1 0-1', 1-2'	1 0 1	1 1 1	TCL
Tributary Sediment	4.1		4	1 3 new wells, 3 existing wells	1 1 0	1 1 0	TCL
Groundwater	4.1			up to 4	0 up to 4	7 6 9 8	TCL
Seeps							
Geophysical Survey							
Slug Testing			3				
New Landfill							
Drainage Path	4.2		6 paths	1 per path	0	1	TCL (exc VOCs)
Soil/Sediment	4.2		6 new wells, 4 existing wells	1	1	1	TCL
Groundwater						12	

TABLE 4-1
REQUIRED SAMPLES

AREA	Survey Type or Media	Figure Showing Locations	Number of Locations	Samples at Each Location	QA/QC Samples duplicates	Total Samples blanks	Analytical Parameters
Seeps	Geophysical Survey	up to 4	6	0	0	up to 4	TCL
<u>Area A</u>	Tank Contents	4.3	1	1	1	0	TCLP, pH, reactivity ignitability TCL TCLP
Soil Borings	Sump Sediments	3	1-2', 3-4'	0	1	1	TCL (exc VOCs)
Drainage Path	Soil/Sediment	1	1	0	0	1	TCL (exc VOCs)
Geophysical Survey		1 path	3 per path	0	0	3	TCL (exc VOCs)
<u>Area B</u>	Soil Borings	4.3	<6	2-3' 0-1, 1	0	1	TCL TCL (exc VOCs)
Trench Soil	Geophysical Survey	2		0	0	0	TCL TCL (exc VOCs)
<u>Area C</u>	Soil Borings	4.3	2	0-1, 2-3', interface	0	0	TCL (exc VOCs)
Trench Soil	Drainage Path	1	1	0-11	1	1	TCL (exc VOCs)
Soil/Sediment		2	1-2'	0	0	0	TCL (exc VOCs)
Geophysical Survey							TCL, TCLP, PH
<u>Industrial Waste Lagoons</u>	Sediment	4.4	3 per lagoon	0-1', 2-3', 0-1'', 2-3', 4-5'	0	1	TCL (exc VOCs)
	South Berm Soil Borings	4.4	4	0	1	0	TCL

TABLE 4-1
REQUIRED SAMPLES

AREA	Survey Type or Media	Figure Showing Locations	Number of Locations	Samples at Each Location	QA/QC Samples duplicates	blanks	Total Samples	Analytical Parameters
<u>Building 3</u>	Concrete Chip Soil Gas		5 16	1 1	0 0	0 0	5 16	TCL TCL
<u>Building 10</u>	Drainage Path Soil/Sediment Concrete Chip Soil Gas	4.6	3 1 4	0-1' 1 1	0 0 0	0 0 0	3 1 4	TCL (exc VOCs),TPH TCL TCL
<u>Building 19</u>	Concrete Chip Soil Gas		1 4	1 1	0 0	0 0	1 4	TCL TCL
<u>Building 43</u>	Soil Gas		4	1	0	0	4	TCL
<u>Building 63</u>	Concrete Chip Surface Soil Soil Gas	4.7	1 2 4	1 0-1' 1	0 1 0	0 1 0	1 4 4	TCL metals, semivolatiles TCL
<u>Building 64</u>	Surface Soil Wipe Concrete Chip		4 1 up to 2	0-1' 1 1	0 0 1	0 0 1	4 2 up to 2	PCBs PCBs PCBs
<u>Building 107</u>	Concrete Chip Soil Gas		1 4	1 1	0 0	0 0	1 4	TCL TCL

TABLE 4-1
REQUIRED SAMPLES

AREA	Survey Type or Media	Figure Showing Locations	Number of Locations	Samples at Each Location	QA/QC Samples duplicates	Total blanks	Total Samples	Analytical Parameters
<u>Building 130</u>				0-1'	0	0	1	TCL (exc VOCs) metals,semivolatiles,PCBs
Surface Soil	4.8		1	1	0	0	1	TCL
Wipe			1	1	0	0	1	TCL
Soil Gas			4	1	0	0	4	TCL
Concrete Chips			2	1	0	0	2	TCL
<u>Building 134</u>								
<u>Sink Trap Inspection</u>				1	0	0	8	TCL
<u>Building 140, 141</u>			8					
Soil Gas								
Alpha/Gamma Radiation Scan								
<u>Building 4, 5, 135, 139</u>								
Radioactivity Survey			12	1	0	0	12	TCL
Concrete Chip			12	1	0	0	12	TCL
Wipe								
<u>Building 6</u>			3	1	0	1	4	TCL, semi-volatiles
Wipe								
<u>Building 139 Sump</u>								
Sump Sludge			1	1	0	0	1	TCL
Soil Borings			4	0-11 2-3', 5-6'	0	0	4	TCL (exc VOCs)
Drainage Path			2	1	0	1	9	TCL
Soil/Sediment							2	TCL
<u>Wastewater Treatment</u>			6	2,0-1' 2,2-3'	0	0	12	TCL (exc VOCs)
Soil Borings					0	1	13	TCL

TABLE 4-1
REQUIRED SAMPLES

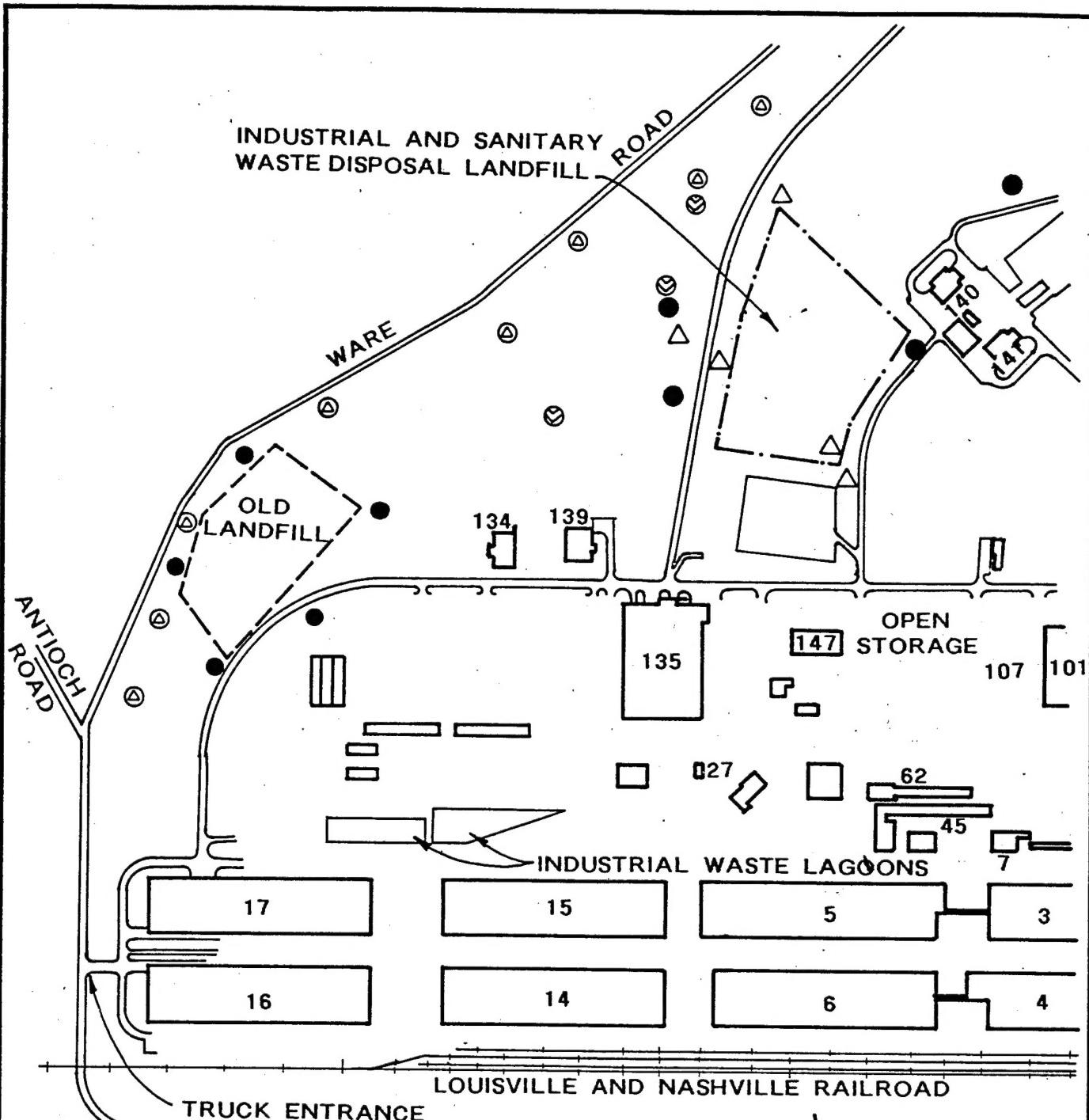
AREA	Survey Type or Media	Figure Showing Locations	Number of Locations	Samples at Each Location	QA/QC Samples duplicates	blanks	Total Samples	Analytical Parameters
Sludge			3	1	1	0	4	TCL
Sediment			5	1	0	1	6	
<u>Building 16</u>								
Concrete Chip			1	1	0	0	1	TCL
Soil Gas			4	1	0	0	4	TCL
<u>Building 27</u>								
Surface Soil			2	1	0	0	2	TCL (exc VOCs)
Concrete Chip			6	2	0	0	12	TCL
Soil Gas			4	1	0	0	4	TCL
<u>Building 42</u>								
Soil Gas			4	1	0	0	4	TCL
<u>Buildings 9, 46</u>								
Surface Soil			3	1	0	1	4	TCL (exc VOCs), TPH
Sludge			1	1	0	0	1	TPH, PCBs, semi-volatiles
Soil Gas			3	1	0	0	3	TCL
<u>Landing Field</u>								
Geophysical								
Soil Gas			8	1	0	0	8	TCL
<u>Building 40</u>								
Soil			3	1	0	0	3	PCBs, TPH
Wipe			2	1	0	0	2	PCBs
<u>Heating Plant Area</u>								
Soil Borings			4	0-1' 2-3'	0	0	4	TCL (exc VOCs), pH
Concrete Chip			1	1	0	0	1	TCL, pH TCL

TABLE 4-1
REQUIRED SAMPLES

AREA	Survey Type or Media	Figure Showing Locations	Number of Locations	Samples at Each Location	QA/QC Samples duplicates	Total blanks	Total Samples	Analytical Parameters
<u>Industrial Wastewater Treatment Plant/Sand Drying Beds</u>	Soil Borings	2 per bed	2	0'- 2-3', 4-5'	0	0	4	TCL (exc VOCs) TCL
Sludge	Deep Soil Borings	3	1	1	0	1	9	TCL
		4	1	1	1	1	5	TCL
							6	
<u>Building 8</u>	Soil	2	0'- 2 per bldg	0	0	0	2	TPH, PCBs, Pesticides
	Concrete Chips	3 bldgs		0	1	1	7	TCL Pesticides,PCBs
<u>Building 45</u>	Soil	2	0'- 1	0	0	0	2	TCL Pesticides
	Wipe	2		0	0	0	2	TCL Pesticides
<u>Building 303</u>	Surface Soil	2	0'- 1	0	1	1	3	TCL Pesticides
	Wipe	2		0	1	1	3	TCL Pesticides
<u>Underground Tanks</u>	Soil Gas							
<u>Buildings 103, 128, 139, 14</u>	Beta/Gamma							
	Radiation Walk-Through							
<u>Open Storage and Shelter Areas</u>	Surface Soil	11	0'- 1	0	0	1	12	TCL (exc VOCs)
	Wipe	2		0	0	0	2	PCBs
	Soil Gas							

TABLE 4-1
REQUIRED SAMPLES

AREA	Survey Type or Media	Figure Showing Locations	Number of Locations	Samples at Each Location	QA/QC Samples duplicates	Total blanks Samples	Analytical Parameters
<u>DRMO Spill Area</u>	Surface Soil		6	0-1'	0	1	TCL (exc VOCs)
<u>Transformer Spill Area</u>	Surface Soil		2	0-1'	0	0	PCBs
<u>Water Supply Wells 1, 3, 4, 7, 8, 9</u>	Groundwater Water Levels		6	1	1	1	TCL, TPH
<u>Asbestos</u>	Building Assessments		up to 200				
<u>Lead-Based Solder and Piping</u>	Water		app.20	1	2	2	app. 24 Lead
<u>Stream Investigation</u>	Surface Water Sediment		up to 32 up to 32	1 1	3 3	3 3	up to 37 up to 37 TCL TCL
<u>Culverts</u>	Sediment		5	1	1	1	TCL
<u>Background Samples</u>	Soil Borings		7	0-1' 2-3'	0 0	0 0	TCL (exc. VOCs) TCL



LEGEND

- BEDROCK MONITORING WELL
- SEDIMENT/SURFACE WATER SAMPLE
- △ DRAINAGE PATH SAMPLE
- ◎ EXISTING WELL

NORTH



OLD LANDFILL AND INDUSTRIAL-SANITARY
LANDFILL SAMPLING LOCATIONS
LEXINGTON FACILITY
LEXINGTON, KENTUCKY

Project Number
007248

Figure
4-1

